AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0100] with the following rewritten paragraph [0100]

[0100] These are described in detail below.

[(1) Regarding the association between regions]

In order to address the case where it is not possible to detect a clear feature point in an image inputted from the camera as in the case of the inner wall of a digestive organ, the image is divided into blocks of small regions (8 × 8 or 16 × 16 pixels) to evaluate internal texture components. As an evaluation formula, the following equation (12) is used.

[Expression 12~~10~~]

$$E_{texture} = \sum_x \sum_y \{I_x^2(x,y) + I_y^2(x,y)\} \quad \cdots\cdots\cdots (12)$$

Please replace paragraph [0107] with the following rewritten paragraph [0107]

[0107] This wave is considered as a soliton f, which is a progressive wave having a constant speed and shape, and can be expressed by a KdV (Korteweg-de Vries) equation in the following equation (13), which is a nonlinear wave equation.

[Expression 13~~11~~]

$$f_t + f_{xxx} + 6ff_x = 0 \quad \cdots\cdots\cdots (13)$$

Please replace paragraph [0109] with the following rewritten paragraph [0109]

[0109] When the speed in the traveling direction at a position x in the progressive direction and at time t is taken as c, a soliton f indicated by the following equation (14) is conceived to be one solution.

[Expression 14~~12~~]

$$f = f(x,t) = 3c\,\mathrm{sech}^2\left[\frac{\sqrt{c}(x-ct)}{2}\right] \text{ --------------------(14)}$$

Please replace paragraph [0118] with the following rewritten paragraph [0118]

[0118] When assuming that in adjacent images, a triangular patch in a past image is taken as the initial value and internal energy E_{int} of a triangular patch is represented by the squared sum of differences in pixel value between control point neighborhood regions (feature regions) and the sum of differences in area between triangular patches, the internal energy E_{int} of the triangular patch is defined as in the following equation (15).

[Expression 15~~13~~]

$$E_{int} = \sum_k \left[\sum_x \sum_y \{ I_{k,f}(x,y) - I_{k,f+1}(x,y) \}^2 \right] + \sum_m (A_{m,f} - A_{m,f+1})^2 \text{ ----------(15)}$$

Please replace paragraph [0122] with the following rewritten paragraph [0122]

[0122] Incidentally, the inside of a digestive tract is cylindrical. In addition, the omnidirectional camera HyperOmni Vision has the nature that all planes including a straight line passing through the viewpoint appear as a great circle in a spherical coordinate system with the viewpoint at its center. Based on this, external energy E_{ext} is defined by the similarity between circles around the camera that are restructured between adjacent images. The circle similarity is defined based on the following equation (16), and the definition is established by the squared sum of distances from control point to great circle after a movement, such that the similarity becomes low when a plurality of great circles (3 to 5 circles) including three or more control points having a relatively large luminance value remain as the great circles after a movement.

[Expression 16~~14~~]

$$E_{ext} = \sum_{n} \sum_{l} \{HC_{l,n,f} - C_{l,n,f+1}\}^2 \quad \cdots\cdots (16)$$

Please replace paragraph [0124] with the following rewritten paragraph [0124]

[0124] Accordingly, by obtaining a control point for minimizing the weighted sum of the internal energy and the external energy,

[Expression 17~~15~~]

$$E = \sum \{\alpha E_{int} + (1-\alpha) E_{ext}\} \quad \cdots\cdots (17)$$

,

corresponding regions in adjacent images are obtained simultaneously with the camera motion, so that deformation between the adjacent images is obtained. Here, α is a constant from 0 to 1. By minimizing the energy E, it is made possible to cut out and paste images taken in a constant camera direction to generate a panoramic image.

Please replace paragraph [0129] with the following rewritten paragraph [0129]

[0129] Here, two types of energies are defined.

The energy indicated in the following equation (18) is energy that is minimized when the distances from the control point at the center to the other four points are equal to the pixel interval on the meshes, and by minimizing this energy, control points that are inclined to maintain the shape as shown in FIG. 19A are selected.

[Expression 18~~16~~]

$$E(x) = \sum_i \left(l_i^t(x) - n\right)^2 \tag{18}$$

Please replace paragraph [0131] with the following rewritten paragraph [0131]

[0131] In addition, the energy indicated in the following equation (19) is energy that is minimized when four distances are equal to each other between the previous and current frames. By minimizing this energy, control points are selected so as to form an arrangement structure similar to that of control points in the previous frame.

[Expression 19~~17~~]

$$E(x) = \sum_i \left(l_i^t(x) - l_i^{t-1}(x)\right)^2 \tag{19}$$

Please replace paragraph [0132] with the following rewritten paragraph [0132]

[0132] By solving the above described ~~above-desceried~~ energy minimization problem, it is made possible to associate control points between successive frames. Accordingly, by pasting images obtained in the respective frames, while deforming them, based on the association between triangular patches surrounded by control points, it is possible to obtain an image of the inside of a digestive tract that has been subjected to a video mosaicking process.